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MONTHLY REPORT

ON THE NUCLEAR FUEL MARKET

NUEXCO

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NUEXCO

MONTHLY REPORT ON THE NUCLEAR FUEL MARKET

February 1986 No. 210

GEORGE WHITE, JR., *EDITOR* CLARK M. BEYER, *ASSOCIATE EDITOR*

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To Our Readers

NUEXCO ORGANIZATIONAL ANNOUNCEMENTS

During the last several months, Nuexco has taken steps internally and externally to strengthen its organization and to increase its ability to provide services in the market it serves. Nuexco has been and intends to remain a service organization to the nuclear fuel industry. Its organizational actions are to that end.

Relocation of Headquarters Office to Denver, Colorado

The relocation of Nuexco's Headquarters to Denver, Colorado, was completed with a organization-wide meeting in December 1985. Nuexco's executive offices are located at Three Park Central, Suite 1045, where Mr. Oren L. Benton has been located for a number of years. All Nuexco personnel are located in Suite 900 at the same address. The expanded facilities and access to other personnel have permitted Nuexco to address a number of services which it has not provided in the past, while supporting and reemphasizing its brokerage, reporting and consulting services. Subscribers, customers and industry representatives are invited to stop in to meet and visit with Nuexco personnel, to see the new facilities, and are welcome to make advance arrangements to use conference rooms and communication facilities for private meetings.

Expansion of Nuexco Services

Because of its new associations and organization, Nuexco is announcing its availability to provide services in a number of areas where it has not regularly done so in the past. Nuexco will continue to provide consulting services in all areas of fuel management and market information, as well as the following new areas.

1. *Financing and Assistance in Arranging Financing.*
Nuexco may be engaged to assist companies in obtaining private financing of projects, transactions or operations. Nuexco affiliates may be involved directly or indirectly in such financing or in arranging such financing, but no equity positions in such companies will be held by Nuexco or such affiliates.
2. *Mergers and Acquisitions Assistance.*
Nuexco may be engaged to assist companies in the nuclear power industry seeking merger, acquisition or joint venture partners, and will be working with other companies who desire, or are willing, to consider investment in the nuclear power industry.
3. *Arbitration Services and Representation in Bankruptcy Proceedings.*
Nuexco may be engaged to assist in resolution of disputes by arbitration and is available to advise companies in bankruptcy proceedings. Such arbitration and representation will be performed within the normally accepted principles of independence and recognition of conflicts of interest.
4. *Escrow Agent Services.*
Nuexco may be engaged to serve as an independent escrow agent for material and cash in domestic or international nuclear fuel transactions. Independent financial institutions will serve in the custodial capacity for any assets with independent instruction from the escrow agent function.
5. *Contract Auditing and Administration.*
Nuexco may be engaged to perform independent financial or operational audits of nuclear fuel contractual arrangements between customers and to deliver reports thereon to the parties, financial institutions, etc.
6. *Testimony on Fuel Matters.*
Although previously involved in this activity, Nuexco can now offer additional experienced personnel to assist in developing nuclear fuel data and to provide testimony to support US utilities in rate-making matters before public utility commissions.

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Organization of Service Operations

Nuexco will maintain its brokerage offices in Stamford, Connecticut, the Geneva suburb of Ferney-Voltaire, France and Menlo Park, California, as in the past. The brokerage activities related to consumers previously served by the Atlanta office will be assumed by the Stamford office. Jerry Reaves will remain in Atlanta as a Consultant to Nuexco where he will work exclusively with producers and will devote special attention, on behalf of Nuexco, to companies developing new sources of US uranium production. United States brokerage operations will be headed by Earl Hoellen. European brokerage operations will continue to be headed by Jim Vaughan. Wayne Fowler, operating out of the Headquarters in Denver, will be in charge of brokerage and other service relationships in Canada. In Australia, South Africa, Taiwan, Korea, and Japan, Nuexco will continue to be represented by the same employee and representative personnel as in the past. Consulting services will be headed by Wayne Fowler in Denver, where Nuexco's extensive data base is maintained. In addition, Nuexco will continue to evaluate expansion possibilities to enhance the efficiency and professionalism of its operations and services.

Reorganization of Nuexco Structure

Nuexco has, in the past, operated in the corporate form. Effective January 1, 1986, Nuexco was reorganized as a partnership in which essentially all brokers and senior personnel became limited partners to preserve a participatory operations style. For certain regulatory and operational reasons, the form of organization and relationships may differ in some countries of Nuexco's operations. All services will continue to be provided under the name "Nuexco".

Formation of International Business Group

Nuexco has formed a group to have as its special focus Nuexco's international presence, as well as opportunities for additional or enhanced services. This group will be headed by Bob Wolcott and will initially include Mr. George Stathakis, Mr. James C.C. Stewart and Mr. Bryan Webster, the latter two having served Nuexco as consultants for several years. Other individuals of international stature will be added to the group. This group, utilizing its extensive international business experience, particularly in the nuclear power industry, will give special consideration to Nuexco's opportunities and concurrent responsibilities in international business matters. In addition, the group will make periodic reexaminations of the principles of Nuexco's international market reporting activities and its publication of the various Nuexco Values which have become industry standards. The group will be available upon request to meet with industry representatives to discuss any questions relative to Nuexco's market reporting activities.

Executive Personnel Announcements

Oren L. Benton, announced in the August 1985 Nuexco Monthly Report as having purchased Nuexco and having assumed the position of Managing Director, will continue to serve Nuexco as the Chairman of its Board of Partners. Operational responsibilities will be delegated to others. Mr. Benton will continue to devote a portion of his time to Nuexco activities but will also devote much of his time to other business interests.

Samuel R. Freeman, Vice President and General Counsel of Rio Grande Industries and its subsidiaries, will serve as Vice Chairman of Nuexco's Board of Partners. Mr. Freeman, a lawyer, has served in the past as Assistant Attorney General for Colorado, Senior Partner of the Van Cise,

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Freeman and Tooley law firm, and Chairman of the Colorado Oil and Gas Conservation Commission. He is presently a member of the Executive Committee of the Interstate Oil Compact Commission and Vice Chairman of the Industry Sector Advisory Committee on Energy for the United States Department of Commerce. Previously, he was a member of the urban Mass Transit Committee of the United States Department of Commerce. Mr. Freeman has been especially active in his company's regulatory relationships, merger and acquisition matters and, in his Colorado Oil and Gas Commission position, has heard over 1,000 cases presented for decision.

George J. Stathakis, formerly President and Chief Executive Officer of General Electric Trading Company, has affiliated with Nuexco in a Consultant capacity on International Investment Banking and will assist in several of Nuexco's service capabilities. Mr. Stathakis spent approximately 20 years in the nuclear power business with General Electric, where he became General Manager of the Atomic Power Equipment Project in 1967 and Vice President and General Manager of the Nuclear Energy Division from 1971 to 1977. Mr. Stathakis was recently appointed by President Reagan as a member of the President's Export Council and is a director of the National Foreign Trade Council, Treasurer of the Business Council for International Understanding, President of the India Chamber of Commerce of America, a director of the Atlantic Council and former chairman and presently a director of the US-Yugoslavia Economic Council.

John C. Amman, formerly Managing Partner of the Denver office of Arthur Andersen & Co., has become associated with Mr. Benton in various areas of banking and finance. Mr. Amman, a Certified Public Accountant, was active during his 25-year career with Arthur Andersen & Co. with public utility clients and their regulatory matters and with banking and financial institutions. He will spend a portion of his time working with Nuexco on consulting projects, particularly involving utility matters, as well as in connection with international financing and escrow service matters.

J. Fred Lawrence, formerly Partner in Charge of Consulting of the Denver office of Arthur Andersen & Co., has become associated with Mr. Benton in a number of business interests. Mr. Lawrence, a Certified Public Accountant and member of the Arthur Andersen firm for 21 years, has served for the past several months as Director of Operations of Nuexco and will continue to spend a portion of his time in consulting and data base administration with Nuexco, working with the Managing Brokers and Consultants.

James E. Lewis, formerly Vice President-Finance of Energy Fuels Nuclear, Inc., has become associated with Mr. Benton in a number of business interests. Mr. Lewis, a Certified Public Accountant, will spend a portion of his time serving Nuexco, particularly in consulting with customers on financing and financial arrangements, mergers and acquisitions, and financial and tax advisory matters.

French Peterson, a businessman from Houston, Texas, has been associated with Mr. Benton in various business interests. Mr. Peterson has been active in a number of investment areas, including particularly oil and gas producing and refining, telecommunications and investment advisory and management. He has been a member of the board of directors of several national organizations, and one of the companies in which he is a major shareholder, board member and active participant, manages in excess of 7 billion dollars for other financial institutions and investors. Mr. Peterson will devote a portion of his time to Nuexco matters in connection with special projects, particularly in financial matters.

Teno Roncalio, retired United States Congressman from the State of Wyoming, has been associated with Mr. Benton in various business interests. Mr. Roncalio, a lawyer, served as a member of the House of Representatives for ten years prior to 1978 and during his tenure served on the Joint Committee on Atomic Energy. Mr. Roncalio has, since his retirement from Congress, consulted with a number of energy-related producers and consumers and has served as an arbitrator in certain cases. Mr. Roncalio will devote a portion of his time to Nuexco matters in connection with special projects.

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NATURAL URANIUM AND SECONDARY MARKET CONVERSION

(All data as of January 31, 1986)

The **Exchange Value** is **$17.00** per pound U_3O_8, unchanged since last month. **Active supply** of natural uranium (concentrates and UF_6) for spot or near-term delivery totals **3,940,000** pounds U_3O_8 equivalent, up 345,000 pounds since last month. The corresponding figure for **active demand** is **2,810,000** pounds, up 485,000 pounds. The spot and near-term **supply-demand ratio** declined to **1.4:1.**

The *Current Market Data* section of this Report lists five natural uranium sales and one of low-enriched uranium, involving approximately 900,000 pounds U_3O_8 in the near term and another 8 million pounds equivalent U_3O_8 in the longer term. Four of the transactions involved near-term delivery and two met the criteria for inclusion in the current Transaction Value calculation. One transaction involved natural UF_6.

The **Transaction Value** is **$16.55** per pound U_3O_8, unchanged since last month. The calculation extends over a 4-month period and includes 14 transactions involving 2.2 million pounds equivalent U_3O_8.

The **UF_6 Value** is **$47.00** per kilogram U in UF_6, unchanged since last month.

The **Conversion Value** is **$1.60** per pound U in UF_6, unchanged since last month. Active supply of secondary market conversion services for delivery within three years totals 575 thousand pounds U as UF_6. No active demand is reported. Two secondary market conversion transactions are reported, involving approximately 750 thousand pounds U as UF_6.

The **Loan Rate** is unchanged at **5 percent** per annum. One loan transaction is reported this month, involving 600 thousand to one million pounds U_3O_8.

* * *

The Exchange Value was unchanged this month due to a lack of substantial market movement. Several transactions occurred at or near the $17.00 level, and material is still available at that level for near-term delivery. Many sellers are focusing on the large number of utilities currently in the longer-term market, although small quantities continue to be sold on the spot market. Although many sellers have offered above the $17.00 level, near-term demand has not been sufficient to sustain upward price movement. Demand for deliveries within the next year to 18 months, however, continues to increase, forcing another small decline in the supply-demand ratio.

The UF_6 Value also was unchanged this month. That market remains thin, and while small amounts of UF_6 probably could be obtained for slightly less than $47.00, large amounts could possibly command as much as a dollar more. One European utility sold from its low-enriched uranium inventory through the process of a deenrichment swap, a common form of inventory liquidation.

* * *

Spot and near-term uranium prices rose steadily, if slowly, in the last three quarters of 1985, and there is a general consensus that this upward movement will continue through 1986. Accordingly, it is not surprising that a large number of utilities are focusing on filling uncontracted longer-term requirements. These requirements generally begin as early as 1987 and 1988, and extend into the mid-1990s.

Since April 1985, utilities worldwide concluded long-term contracts which will result in the delivery of more than 37 million pounds U_3O_8. Furthermore, at least thirteen additional utilities are currently evaluating proposals, awaiting responses to bid invitations, or negotiating directly with potential suppliers. These buyers are seeking more than 40 million pounds U_3O_8, most of which is for delivery prior to 1995. To the extent that these buyers are motivated by the desire to provide for long-term needs while prices are still low and the best deals still available, some are apt to be disappointed. While the lowest-cost producers have the ability to offer attractive terms in almost any market environment, they have little reason for doing so once their facilities are base-loaded or delivery commitments approach production capacity. It is important to note that just as utilities desire diversity among their uranium suppliers, producers also desire diversity among utility customers. For example, a low-cost Canadian producer, while having the ability to place *all* of its production with US buyers, could elect to allocate only 50 percent of its production to the US market because of its desire to diversify its customer base to include utilities in Europe and the Far East.

In view of the number of buyers in or about to enter the long-term market, the next several months should provide some guidance as to market direction throughout 1986. If all these requirements are to be satisfied, substantial quantities of higher-cost (and presumably higher-priced) material will have to be included. Some buyers, if disappointed in the offers received, could elect to do nothing for the present, hoping for more favorable offers at some later date. Others could pursue a "buy and hold" strategy, effectively using spot uranium to satisfy longer-term needs. This activity would probably cause spot prices to rise, increasing the relative attractiveness of currently offered long-term prices.

* * *

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PRICING

ENRICHED URANIUM AND SWUS

The **SWU Value** as of January 31, 1986, is $80 per SWU. This refers to SWU at a tails assay of 0.30 weight-percent U_{235} and for delivery within one year. Two secondary market SWU transactions are reported this month, involving approximately 200 thousand SWUs of Eurodif and DOE origin.

In the wake of these transactions, the secondary market for SWU is considerably smaller than in the last several months. Consequently, transactions are likely to be infrequent in the immediate future. Despite a limited number of market participants, the SWU prices offered vary widely, because some potential sellers have yet to make the commitment to price competitively. For the present, these sellers have chosen not to release their SWU (most of which is contained in low-enriched uranium) until higher prices are available. Since there are few buyers, that is not likely to happen soon. Those sellers having virgin SWU can command a higher price (the premium associated with virgin SWU can be as much as $10 per SWU), but again, the lack of firm demand precludes transactions at present.

In addition to price, sellers of virgin SWU and sellers of SWU contained in enriched product are differentiated by their preferred timing of sales. Usually, the virgin SWU seller prefers to sell as late as possible in the fiscal year, so that it can pay the DOE charges in September rather than earlier in the fiscal year. On the other hand, sellers holding low-enriched uranium normally prefer to sell for immediate delivery and payment.

* * *

Continuing the trend toward lower prices for primary enrichment services, DOE announced that it will sell fiscal 1987 SWU for $119 per SWU, a six dollar per SWU reduction from the current Utility Services enrichment contract (USEC) price. This represents the third consecutive year in which DOE has lowered the price of its enrichment services.

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CURRENT MARKET DATA

January 31, 1986	Market Values	Active Supply[1] (thousands)	Active Demand[1] (thousands)
EXCHANGE VALUE	**$17.00**/lb. U_3O_8	3,940	2,810
UF_6 VALUE	**$47.00**/kgU		
CONVERSION VALUE	**$1.60**/lb. U as UF_6	575	0
SWU VALUE 0.3 tails assay; delivery within one year	**$80**/SWU		
LOAN RATE	5%/annum	0	0

	$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
TRANSACTION VALUE	**16.55**	2.2	13	4

[1]Supply and demand tables in *Current Market Data* section of this Report detail the numbers for each category.

DEFINITIONS

1. The **Exchange Value** is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.
2. The **UF_6 Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the date indicated.
3. The **Conversion Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.
4. The **SWU Value** represents Nuexco's judgment of the price at which transactions for the sale of significant quantities of SWUs of stated origin for delivery in the specified time period could be concluded as of the date indicated.
5. The **Loan Rate** is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.
6. The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:
   a. Transactions closed within the previous three-month period for which delivery is scheduled within one year of the transaction date;
   b. At least ten transactions;
   c. Transactions involving a sum total of at least 2 million pounds U_3O_8 equivalent.

   The sample time is extended as necessary to include these minima. Other currencies are converted to US dollars using conversion rates in effect on or near the transaction date.

DERIVATIONS AND COMMENTS

1. All Market Values are based on:
   a. Data from recently completed transactions.
   b. Data from pending transactions.
   c. Firm bids to buy or borrow, and firm offers to sell or lend.
   d. Prices purchasers or rates borrowers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy or borrow, and prices sellers or rates lenders have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell or lend.
2. Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not included in the determination of these Market Values.
3. In the determination of the Conversion Value, Nuexco does not consider transportation charges other than those customarily provided by primary suppliers of conversion services.
4. The prices of conversion services or SWUs delivered under long-term contracts with primary suppliers are not considered in the determination of either the Conversion Value or SWU Value.
5. For the SWU Value, Nuexco converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight-percent U^{235} and a product assay of 3.0 weight-percent U^{235}, assuming feed costs corresponding to the Nuexco Exchange and Conversion Values determined as of the same date.
6. In calculating the Transaction Value, Nuexco does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future Exchange Values or any other indeterminate variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it cannot currently be determined.

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CURRENT MARKET DATA

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Jan 31, 1986)	Last Month (Dec 31, 1985)	12 Months Ago (Jan 31, 1985)	This Month (Jan 31, 1986)	Last Month (Dec 31, 1985)	12 Months Ago (Jan 31, 1985)
Australia (dollar)	23.74	24.92	18.38	61.71	64.78	47.78
Belgium (comm. franc)	828.06	854.70	949.37	2,153	2,222	2,468
Canada (dollar)	24.14	23.78	19.91	62.75	61.81	51.77
Finland (markka)	90.62	92.19	99.40	235.59	239.68	258.43
France (franc)	123.82	128.40	145.07	321.90	333.81	377.14
FRG (mark)	40.38	41.87	47.53	104.98	108.86	123.56
Italy (lira)	27,557	28,509	29,240	71,642	74,117	76,017
Japan (yen)	3,275	3,413	3,817	8,514	8,873	9,923
Netherlands (guilder)	45.70	47.16	53.74	118.81	122.60	139.72
South Africa (rand)	38.72	43.87	29.56	100.67	114.05	76.84
Spain (peseta)	2,548	2,621	2,628	6,625	6,815	6,832
Sweden (krona)	127.63	128.98	135.62	331.80	335.33	352.59
Switzerland (franc)	34.29	35.31	40.11	89.14	91.79	104.27
UK (pound)	12.02	11.82	13.27	31.25	30.73	34.50
US (dollar)	17.00	17.00	15.00	44.20	44.20	39.00

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Jan 31, 1986)	Last Month (Dec 31, 1985)	12 Months Ago (Jan 31, 1985)	This Month (Jan 31, 1986)	Last Month (Dec 31, 1985)	12 Months Ago (Jan 31, 1985)
Australia (dollar)	23.11	24.26	19.85	60.08	63.07	51.60
Belgium (comm. franc)	806.14	832.08	1,025	2,096	2,163	2,666
Canada (dollar)	23.50	23.15	21.51	61.09	60.18	55.91
Finland (markka)	88.22	89.75	107.36	229.35	233.33	279.10
France (franc)	120.54	125.00	156.67	313.37	324.97	407.31
FRG (mark)	39.31	40.76	51.33	102.20	105.98	133.45
Italy (lira)	26,828	27,754	31,579	69,746	72,155	82,098
Japan (yen)	3,188	3,323	4,122	8,289	8,638	10,717
Netherlands (guilder)	44.49	45.91	58.04	115.66	119.35	150.90
South Africa (rand)	37.70	42.71	31.92	98.01	111.04	82.99
Spain (peseta)	2,481	2,552	2,838	6,450	6,635	7,378
Sweden (krona)	124.25	125.57	146.47	323.02	326.45	380.80
Switzerland (franc)	33.38	34.37	43.32	86.78	89.36	112.61
UK (pound)	11.70	11.51	14.33	30.42	29.92	37.25
US (dollar)	16.55	16.55	16.20	43.03	43.03	42.12

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on January 31, 1986.

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CURRENT MARKET DATA

CONVERSION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U as UF_6			per kg. U as UF_6		
	This Month (Jan 31, 1986)	Last Month (Dec 31, 1985)	12 Months Ago (Jan 31, 1985)	This Month (Jan 31, 1986)	Last Month (Dec 31, 1985)	12 Months Ago (Jan 31, 1985)
Australia (dollar)	2.23	2.35	1.23	4.93	5.17	2.70
Belgium (comm. franc)	77.93	80.44	63.29	171.82	177.34	139.53
Canada (dollar)	2.27	2.24	1.33	5.01	4.93	2.93
Finland (markka)	8.53	8.68	6.63	18.80	19.13	14.61
France (franc)	11.65	12.08	9.67	25.69	26.64	21.32
FRG (mark)	3.80	3.94	3.17	8.38	8.69	6.99
Italy (lira)	2,594	2,683	1,949	5,718	5,915	4,298
Japan (yen)	308.23	321.22	254.45	679.52	708.17	560.97
Netherlands (guilder)	4.30	4.44	3.58	9.48	9.78	7.90
South Africa (rand)	3.64	4.13	1.97	8.04	9.10	4.34
Spain (peseta)	239.84	246.72	175.19	528.77	543.93	386.23
Sweden (krona)	12.01	12.14	9.04	26.48	26.76	19.93
Switzerland (franc)	3.23	3.32	2.67	7.11	7.33	5.89
UK (pound)	1.13	1.11	0.88	2.49	2.45	1.95
US (dollar)	1.60	1.60	1.00	3.53	3.53	2.20

SWU VALUE AND UF_6 VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	SWU Value delivery within one year (January 31, 1986)	UF_6 Value per kg.U in UF_6 This Month (January 31, 1986)	UF_6 Value per kg.U in UF_6 Last Month (December 31, 1985)
Australia (dollar)	111.70	65.62	68.89
Belgium (comm. franc)	3,897	2,289	2,363
Canada (dollar)	113.59	66.73	65.73
Finland (markka)	426.44	250.53	254.88
France (franc)	582.67	342.32	354.98
FRG (mark)	190.02	111.64	115.76
Italy (lira)	129,681	76,187	78,819
Japan (yen)	15,411	9,054	9,436
Netherlands (guilder)	215.05	126.34	130.37
South Africa (rand)	182.23	107.06	121.29
Spain (peseta)	11,992	7,045	7,247
Sweden (krona)	600.60	352.85	356.60
Switzerland (franc)	161.36	94.80	97.61
UK (pound)	56.56	33.23	32.68
US (dollar)	80.00	47.00	47.00

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on January 31, 1986.

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CURRENT MARKET DATA

RECENT TRANSACTIONS[1]

Uranium Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current Exchange or UF_6 Value	Seller	Buyer	Remarks
3666A	1986	50-100	indeterminate	European Utility	European Utility	Contained in LEU.
3658	1986	50-100	98	US Producer	US Producer	
3657	1990-2000	3,001-5,000	see remarks	US Producer	US Utility	Discount off market price.
3656	1990-1994	3,001-5,000	see remarks	Canadian Producer	US Utility	UF_6. Discount off market price.
3655	1986	less than 50	100	US Producer	US Utility	
3651	1986	601-1000	R[5]	European Utility	US Producer	

Loan Transactions

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current Loan Rate	Lender	Borrower	Remarks
3668	1985	601-1,000	R[5]	Utility	Producer	

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RECENT TRANSACTIONS[1] (continued)

Conversion Services
Secondary Market Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price as Percent of Current C.V.	Seller	Buyer	Remarks
3670	1986	101-300	100	European Utility	US Utility	
3669	1986	301-600	R[5]	European Utility	US Utility	

Enrichment Services
Secondary Market Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity[2] (thousands of SWUs)	Approximate Price[3] as Percent of Current SWU Value[4]	Seller	Buyer	SWU Origin	Remarks
3667	1986	101-300	R[5]	European Utility	US Utility	Eurodif and DOE	
3666B	1986	less than 50	indeterminate	European Utility	European Utility	Eurodif and DOE	Contained in LEU.

[1]Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2]If tails assay is unknown or unspecified, Nuexco's calculation of SWU quantity assumes 0.20 w/o tails assay.
[3]Price is not normalized to 0.20% tails assay.
[4]Refers to SWU Value that corresponds to SWUs included in transaction. When prices and SWU values are expressed as discounts (e.g. X dollars less than DOE's USEC base price at time of delivery), the percentage refers to the ratio of the *discounts*, not the ratio of the prices.
[5]The notation *R* means that Nuexco either does not know, or that Nuexco has restricted that information to protect client confidentiality.

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CURRENT MARKET DATA

URANIUM SUPPLY
(January 31, 1986)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
2335*	300	—	
2680	500	500 per year	1987-92
2728	350	—	
2740*	175	—	
2793	1,000	—	
2813*	140	—	
2818*	600	—	UF_6
2851*	125	—	
3023*	750	500	UF_6
2263	—	400 per year	1987 on
2625	—	500 per year	1987 on
2778	—	220 per year	1987-90
2781	—	100 per year	1988-95
TOTAL:	3,940		
INACTIVE			
2336	250	250 per year	1986-94
2389	75	75 per year	1986-90
2654	300	700 per year	UF_6
2764	260	—	UF_6
2765	260	—	UF_6
2777	250	—	
2297	—	200 per year	1986-89
TOTAL:	1,395		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 1860, 2483, 2746, 2802, 2804, 2814.

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URANIUM DEMAND
(January 31, 1986)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or long-term	Remarks
Inquiries to Purchase:			
ACTIVE			
2733	500	500 per year	1987-95
2743*	600	—	UF_6
2758	1,000	500	UF_6
2786	60	—	
2888*	650	—	
2217	—	1,000 per year	1989-95
2507	—	600	1987-89
2586	—	250 per year	1988-95
2681	—	500 per year	UF_6 or U_3O_8; 1987-88
2738	—	1,000	1989 on
2739	—	1,000 per year	1987-90
2760	—	750 per year	1986-90
2770	—	500 per year	1988-94
2782*	—	800	1987-88
2808*	—	300	1987 on
2821	—	120 per year	1988-93
2850*	—	300 per year	1990-95
2870	—	100	1989
TOTAL:	2,810		
INACTIVE			
2548	290	—	
2784*	100	—	
2798	70	—	
2806	1,000	—	
TOTAL:	1,460		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 2643, 2748, 2762, 2796.

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CURRENT MARKET DATA

LOAN SUPPLY AND DEMAND
(January 31, 1986)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Within 1 Year	Beyond 1 Year	Remarks
Available for Loan:			
INACTIVE			
1938	2,000	—	UF_6
2036	500	—	
2667	800	—	
2805*	2,000	—	
TOTAL:	5,300		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: None.

No inquiries to borrow are reported this month.

CONVERSION SUPPLY AND DEMAND
(January 31, 1986)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U as UF_6) Within 3 Years	Beyond 3 Years	Remarks
Available for Sale:			
ACTIVE			
2849	300	900	1986-90
2874*	275	—	
TOTAL:	575		
Inquiries to Purchase:			
INACTIVE			
2724	—	375	1989-93
2882*	—	1,000	1987
TOTAL:	0		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: 2051.

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SWU SUPPLY AND DEMAND
(January 31, 1986)

Nuexco Project Number	Delivery Period[1] (Thousands of SWUs) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
2705*	125	—	
2571	—	55	
2873*	40	—	1987
2889*	25	—	
TOTAL:	190		
INACTIVE			
2410A*	340	—	
TOTAL:	340		
Inquiries to Purchase:			
INACTIVE			
2761	115	—	
2797	—	150	1988-89
TOTAL:	115		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes SWUs deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 2652, 2746.

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ANALYSIS & COMMENTARY

NON-US NUCLEAR POWER PLANT BACKLOG

Construction Progress

As of January 1986, 69 units comprised the non-US nuclear power plant backlog (excluding Soviet-bloc countries). Table 1 lists those units by country in descending order of construction completion percentage. A unit enters the backlog when construction starts and exits when commercial operation begins. Thus, the backlog does not include units on which construction has not begun, such as nine units undergoing licensing in Japan. It also does not include units which have been delayed indefinitely, such as four units in Spain for which construction was terminated.

Table 1 lists the completion percentage for each unit in January 1984 and in January 1986, and uses that percentage change as a measure of progress. Table 2 then shows a breakdown of the construction progress for all of the units, placing them into a series of ten-percent ranges. The overall range of progress includes two units exhibiting at least 60 percent progress in the two-year span — Ontario Hydro's Darlington Unit 2 and Chubu Electric Power Company's Hamaoka Unit 3. Despite these remarkable achievements, thirteen units accomplished changes of less than ten percent. No units underwent negative progress.

Comparison Among Nations

Table 3 presents the current status of active nuclear power programs worldwide. The far-right column of Table 3 shows the average progress on backlog, a megawatt-weighted average of changes in completion percentages, achieved by each country. A megawatt-weighted average incorporates the varying sizes of units in a particular program, so that progress on a smaller unit is given less weight than progress on a large unit. The megawatt-weighted average progress on the entire non-US backlog was 27 percent, one percent greater than in the previous two-year span (1982-1984), and 13 percent greater than that for the USA during the same period. Next month's Report (211) will contain an analysis of the US construction backlog.

Table 3 also lists the average size of the units under construction in each country, which puts the country's progress in better perspective. For example, the United Kingdom's average progress of 31 percent for units averaging 680 MWe is not nearly as impressive as the 35 percent progress made by France, where the average unit under construction is almost twice as large.

From Table 3 it is evident that all of the nations' average construction progress fall into two groups. Nine nations achieved average progress of 25 to 35 percent. Four nations achieved average progress of less than ten percent. Table 4 takes this a step further, ranking the countries that have active construction programs involving four or more units, including the USA, according to their construction progress on backlog. For the period of January 1984 to January 1986, the nations leading the ranking were much closer to parity than in a similar analysis by Nuexco for the period 1982 to 1984 (Report 189, May 1984). The average

Table 2

CONSTRUCTION PROGRESS ON NON-US BACKLOG BETWEEN JAN. 1984 AND JAN. 1986 (As measured by changes in completion percentages)

Change in Completion Percentage[1]	Number of Units[2]
60-69	2
50-59	2
40-49	17
30-39	13
20-29	11
10-19	8
0-9	13
TOTAL	66

[1] As listed in Table 1 of this article.

[2] Excludes three units in China for which data is not available.

Table 4

INTERNATIONAL RANKING OF NUCLEAR POWER PLANT CONSTRUCTION PROGRAMS[1]

Country	Units Under Construction	Average MWe per Unit	Average Progress on Backlog[2]
France	19	1240	35
South Korea	4	916	35
Canada	7	810	34
United Kingdom	4	680	31
F.R. Germany	6	980	30
Japan	10	668	25
USA	32	1123	14
India	4	220	0

[1] Includes only those countries with four or more units currently defined as under construction.

[2] Average progress on backlog measures the average change in completion percentage for units under construction during the two-year period from January 1984 to January 1986, incorporating a MWe-weighted adjustment for differences in the size of those units. The calculation excludes units that began commercial operation during that period.

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progress for each of the top five nations now falls within a few points of 33 percent. In addition, all of these countries are progressing on their backlogs more than *twice* as rapidly as the USA, where regulatory and financing difficulties continue to prolong completion schedules.

Table 1
NON-US NUCLEAR POWER PLANT BACKLOG

Country	Unit	MWe (net)	Utility[1]	Completion Percentage		Change in Completion Percentage
				Jan. 1984[2]	Jan. 1986[3]	
Argentina	Atucha 2	692	CNEA	25	50	25
Brazil	Angra 2	1245	Furnas	10	20	10
	Angra 3	1245	Furnas	1	1	0
Canada	Pickering 8	516	Ontario Hydro	70	99	29
	Bruce 7	750	Ontario Hydro	50	99	49
	Bruce 8	750	Ontario Hydro	40	85	45
	Darlington 1	881	Ontario Hydro	0	40	40
	Darlington 2	881	Ontario Hydro	15	80	65
	Darlington 3	881	Ontario Hydro	0	10	10
	Darlington 4	881	Ontario Hydro	0	5	5
China	Quinshan	300	MNI	0	unknown	
	Guangdong 1	900	MNI	0	unknown	
	Guangdong 2	900	MNI	0	unknown	
France	Flamanville 1	1290	EDF	65	100	35
	Flamanville 2	1290	EDF	50	88	38
	St. Alban 2	1300	EDF	55	90	35
	Paluel 4	1290	EDF	55	86	31
	Cattenom 1	1265	EDF	55	85	30
	Cattenom 2	1265	EDF	40	73	33
	Chinon B3	870	EDF	35	79	44
	Chinon B4	870	EDF	25	69	44
	Belleville 1	1275	EDF	35	79	44
	Belleville 2	1275	EDF	21	67	46
	Nogent-sur-Seine 1	1275	EDF	25	67	42
	Nogent-sur-Seine 2	1275	EDF	12	52	40
	Cattenom 3	1265	EDF	1	50	49
	Cattenom 4	1265	EDF	0	30	30
	Penly 1	1290	EDF	0	45	45
	Penly 2	1290	EDF	0	18	18
	Golfech 1	1275	EDF	0	28	28
	Golfech 2	1275	EDF	0	14	14
	Chooz B1	1375	EDF	0	25	25
F.R. Germany	Kaerlich	1227	RWE	80	100	20
	Kalkar SNR 300	295	SBK	75	95	20
	Isar 2	1285	KKI	20	65	45
	Emsland	1242	VEW	0	50	50
	GKN 2	1230	GKN	5	27	22
	Brokdorf	1290	Preussenelektra	0	15	15

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Table 1 (continued)

NON-US NUCLEAR POWER PLANT BACKLOG

Country	Unit	MWe (net)	Utility[1]	Completion Percentage		Change in Completion Percentage
				Jan. 1984[2]	Jan. 1986[3]	
India	NAPP 1	220	AEC	40	40	0
	NAPP 2	220	AEC	30	30	0
	KAPP 1	220	AEC	13	13	0
	KAPP 2	220	AEC	13	13	0
Italy	Cirene	40	Enel	56	70	14
	Montalto 1	982	Enel	25	28	3
	Montalto 2	982	Enel	20	23	3
Japan	Tsuruga 2	1115	JAPC	36	92	56
	Fukushima II-4	1067	Tokyo EPC	70	90	20
	Hamaoka 3	1066	Chubu EPC	15	75	60
	Shimane 2	791	Chugoku EPC	0	35	35
	Tomari 1	579	Hokkaido EPC	0	42	42
	Tomari 2	579	Hokkaido EPC	0	3	3
	Kashiwazaki 2	1067	Tokyo EPC	0	13	13
	Kashiwazaki 5	1067	Tokyo EPC	0	19	19
	Genkai 3	1180	Kyushu EPC	0	2	2
	Genkai 4	1180	Kyushu EPC	0	1	1
S. Korea	Korea Nuclear 6	895	Kepco	76	100	24
	Korea Nuclear 7	900	Kepco	60	98	38
	Korea Nuclear 8	900	Kepco	50	90	40
	Korea Nuclear 9	943	Kepco	22	64	42
	Korea Nuclear 10	943	Kepco	20	50	30
Mexico	Laguna Verde 1	654	CFE	75	93	18
	Laguna Verde 2	654	CFE	40	42	2
Philippines	PNPP 1	620	Napocor	70	99	29
Spain	Trillo 1	997	UE/Iberduero	44	70	26
	Vandellos 2	982	Enher/HC	42	80	38
United Kingdom	Dungeness B2*	600	CEGB	100	100	0
	Torness Pt. 1	660	SSEB	50	95	45
	Torness Pt. 2	660	SSEB	35	78	43
	Heysham B1	660	CEGB	50	80	30
	Heysham B2	660	CEGB	35	70	35

*Unit entered commercial operation in 1986.

[1] See box on page 16 for list of acronyms used in this table.

[2] As listed in *Nuclear News* "World List of Nuclear Power Plants" of December 31, 1983, and other publications.

[3] As listed in *Nuclear News* "World List of Nuclear Power Plants" of December 31, 1985, and other publications.

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Table 3

ACTIVE NUCLEAR POWER PROGRAMS[1]
(Excluding Soviet-bloc Nations)

Country	Units in Commercial Operation	MWe in Commercial Operation (net)	Units Under Construction	MWe Under Construction (net)	Avg. Size of Units Under Construction	Avg. Progress on Backlog[1] (MWe-Weighted)
Argentina	2	935	1	692	692	25
Belgium	7	5,450	0	0	—	—
Brazil	1	626	2	2,490	1245	5
Canada	15	9,562	7	5,670	810	34
China	0	0	3	2,100	700	unknown
Finland	4	2,310	0	0	—	—
France	46	37,858	19	23,575	1240	35
F. R. Germany	17	16,410	6	6,569	980	30
India	6	1,244	4	880	220	0
Italy	3	1,285	3	2,004	668	3
Japan	32	23,491	10	9,691	901	25
S. Korea	4	2,685	5	4,581	916	35
Mexico	0	0	2	1,308	654	10
Netherlands	2	500	0	0	—	—
Pakistan	1	125	0	0	—	—
Philippines	0	0	1	620	620	29
South Africa	2	1,840	0	0	—	—
Spain	8	5,682	2	1,979	990	32
Sweden	12	9,435	0	0	—	—
Switzerland	5	2,890	0	0	—	—
Taiwan	6	4,884	0	0	—	—
United Kingdom	38	11,748	4	2,720	680	31
Yugoslavia	1	632	0	0	—	—
TOTAL NON-US	212	139,592	69	64,849	939	27
USA[3]	90	75,368	32	35,927	1123	14
TOTAL	302	214,960	101	100,776	998	23

[1] Not including units for which the commercial operation date is indefinite.

[2] Average progress on backlog measures the average change in completion percentage for units under construction during the two-year period from January 1984 to January 1986, incorporating an adjustment for differences in the size of those units.

[3] Nuexco will publish the US Nuclear Backlog next month in Report 211.

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ANALYSIS & COMMENTARY

Growth in Installed Capacity

Between January 1984 and January 1986, 53 units outside of the USA began commercial operation, well over twice as many as entered commercial service in the previous two-year period. The units added approximately 47,000 net MWe to world generating capacity, or about one-fifth of current free-world capacity. Table 5 lists those 53 units, along with their construction status in January 1984. Notable among these are Belgium's Doel Unit 4 and Tihange Unit 3, which were well under half-complete in January 1984, but entered commercial operation in mid-1985; also, Kyushu Electric Power Company's Sendai Unit 2, which was 50 percent complete in January 1984 and began commercial operation in late 1985. Interestingly, all six of the Central Electricity Generating Board (CEGB) units that came on line during the period were 100-percent complete in January 1984.

Of the 69 units in the current backlog, a number are near the commercial stage. Table 6 provides a breakdown of completion percentages of units in the non-US backlog, and illustrates that 30 percent of these units are between 80 and 100-percent complete, and well over half of the units are 50-percent complete or more. This data suggests that non-US nuclear capacity will continue to grow significantly within the next several years.

Table 6

COMPLETION PERCENTAGES OF UNITS IN NON-US BACKLOG

Percent Complete[1]	Number of Units[2]
90-100	13
80-89	7
70-79	8
60-69	5
50-59	5
40-49	5
30-39	3
20-29	6
10-19	8
0-9	6
TOTAL	66

[1] As listed in Table 1 of this article.
[2] Excludes one unit listed in Table 1 that has begun commercial operation during 1986, and three units in China for which data is not available.

Acronyms Used in Tables 1 and 5

AEC = Atomic Energy Commission (India)
CEGB = Central Electricity Generating Board
CFE = Comision Federal de Electricidad
CNEA = Comision Nacional de Energia Atomica
Ebes = Societes Reunies d'Energie du Bassin
EDF = Electricité de France
Enel = Ente Nationale per l'Energia Elettrica
Enher = Empresa Nacional Hidroelectrica Ribagorzana
EPC = Electric Power Company
Escom = Electricity Supply Commission
EVS = Energie Versorgung Schwaben
Fecsa = Fuerzas Electricas de Cataluna S.A.
GKN = Gemeinschaftkernkraftwerk Neckar
HC = Hidroelectrica de Cataluna SA
HEW = Hamburgische Elektricitaetswerke
Hidrola = Hidroelectrica Española S.A.
HKG = Hochtemperatur-Kernkraftwerk GmbH
Intercom = Société Intercommunale Belge de Gaz et d'Electricité
JAPC = Japan Atomic Power Company
Kepco = Korea Electric Power Corporation
KKI = Kernkraftwerk Isar
KKL = Kernkraftwerk Leibstadt AG
MNI = Ministry of Nuclear Industry (China)
Napocor = Philippine National Power Corporation
Nersa = Centrale Nucléaire Européene a Neutrons Rapides S.A.
OKG = Oskarshamnsverkets Kraftgrupp Aktiebolag
PNC = Power Reactor and Nuclear Fuel Company
RWE = Rheinisch-Westfalisches Elektrizitaetswerk
SBK = Schnell-Bruter-Kernkraftwerksgesellschaft
SSEB = South of Scotland Electricity Board
SSPB = Swedish State Power Board
UE = Union Electrica
VEW = Vereinigte Elektrizitaetswerke Westfalen

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Table 5

UNITS THAT BEGAN COMMERCIAL OPERATION BETWEEN JAN. 1984 AND JAN. 1986

Country	Unit	Net MWe	Lead Utility[1]	Percent Complete Jan. 1984[2]	Commercial Operation Date
Belgium	Doel 4	1000	Ebes	40	Jul 1985
	Tihange 3	1000	Intercom	30	Sep 1985
Brazil	Angra 1	626	Furnas	100	Dec 1984
Canada	Pickering 6	516	Ontario Hydro	100	Feb 1984
	Bruce 6	795	Ontario Hydro	80	Sep 1984
	Pickering 7	516	Ontario Hydro	80	Jan 1985
	Bruce 5	795	Ontario Hydro	70	Mar 1985
France	Chinon B1	870	EDF	100	Feb 1984
	Cruas 1	880	EDF	100	Apr 1984
	Chinon B2	870	EDF	100	Aug 1984
	Cruas 3	880	EDF	98	Sep 1984
	Gravelines C5	910	EDF	85	Jan 1985
	Cruas 4	880	EDF	85	Feb 1985
	Cruas 2	880	EDF	98	Apr 1985
	Gravelines C6	910	EDF	70	Nov 1985
	Paluel 1	1290	EDF	100	Dec 1985
	Paluel 2	1290	EDF	95	Dec 1985
	St Alban 1	1300	EDF	70	Dec 1985
	Paluel 3	1290	EDF	70	Dec 1985
	Creys-Malville	1200	Nersa	85	Jan 1986
F.R. Germany	Kreummel	1260	HEW	100	Mar 1984
	Gundremmingen 2	1244	RWE	100	Jul 1984
	Gundremmingen 3	1244	RWE	80	Jan 1985
	Grohnde	1300	Preussenelektra	85	Feb 1985
	Philippsburg 2	1268	Badenwerk/EVS	95	Apr 1985
	THTR 300	296	HKG	85	Jul 1985
India	MAPP 1	220	AEC	100	Jan 1984
	MAPP 2	220	AEC	88	Oct 1985

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Table 5 (continued)

UNITS THAT BEGAN COMMERCIAL OPERATION BETWEEN JAN. 1984 AND JAN. 1986

Country	Unit	Net MWe	Lead Utility[1]	Percent Complete Jan. 1984[2]	Commercial Operation Date
Japan	Fukushima II-2	1067	Tokyo EPC	100	Feb 1984
	Onagawa 1	497	Tohoku EPC	100	Jun 1984
	Sendai 1	846	Kyushu EPC	100	Jul 1984
	Takahama 3	830	Kansai EPC	92	Jan 1985
	Takahama 4	830	Kansai EPC	75	Jun 1985
	Fukushima II-3	1067	Tokyo EPC	85	Jul 1985
	Kashiwazaki 1	1067	Tokyo EPC	85	Sep 1985
	Sendai 2	846	Kyushu EPC	50	Nov 1985
S. Korea	Korea Nuclear 5	895	Kepco	90	Sep 1985
South Africa	Koeberg 1	922	Escom	100	Jul 1984
	Koeberg 2	922	Escom	96	Nov 1985
Spain	Asco 1	887	Fecsa/Enher	100	Dec 1984
	Cofrentes	975	Hidrola	98	Mar 1985
	Asco 2	887	Fecsa/Enher	98	Jun 1985
Sweden	Forsmark 3	1050	SSPB	75	Aug 1985
	Oskarashamn 3	1050	OKG	65	Aug 1985
Switzerland	Leibstadt	950	KKL	100	Dec 1984
Taiwan	Maanshan 1	890	Taiwan Power	94	Jul 1984
	Maanshan 2	890	Taiwan Power	78	May 1985
United Kingdom	Dungeness B1	600	CEGB	100	Mar 1984
	Hartlepool R1	625	CEGB	100	May 1984
	Heysham A1	625	CEGB	100	May 1984
	Hartlepool R2	625	CEGB	100	Feb 1985
	Heysham A2	625	CEGB	100	Feb 1985
	Dungeness B2	600	CEGB	100	Jan 1986

[1] See box on page 16 for list of acronyms used in this table.
[2] As listed in the *Nuclear News* "World List of Nuclear Power Plants" of December 31, 1983.

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EUROPE

Superphénix, the 1,200-MWe liquid-sodium Fast Breeder Reactor (FBR) was connected to the French electricity grid on January 14, 1986, an impressive achievement for the European consortium building this unit. The unit is twice the size of the Soviet BN-600 FBR (Table 7), and is the only FBR in the world having a capacity comparable to the world's largest light-water reactors (LWR). The unit should reach full power within the next few months. Superphénix is located on the Rhone River 50 kilometers east of Lyon, France. It is owned by NERSA (Centrale Nucléaire Européene a Neutrons Rapides SA), of which EDF (Electricité de France) owns 51 percent, the Italian state utility ENEL (Ente Nationale per l'Energia Elettrica) owns 33 percent, and SBK (Schnell-Breuter Kernkraftwerksgesellschaft) mbH), the North European utility consortium formed to build the Kalkar FBR, owns 16 percent. Power from Superphénix will be distributed at cost to the owners.

The cost of building Superphénix was more than twice that of a standard French 1,200-MWe thermal reactor. One reason for the comparatively high cost is that the FBR, unlike a contemporary French LWR, is not standardized and mass-produced. Even if it were replicated *en masse*, however, the FBR would still be more expensive, primarily because of the design complexities associated with the sodium circuit, the control of the reactor, and the fuel construction. The fuel core of Superphénix contains approximately 4.7 metric tons (MT) plutonium (Pu), along with some 30 MTU as natural uranium; the outlying fuel bed is composed of natural UO_2.

Over the life of the FBR, reprocessing of fuel will yield more Pu than is burned in the unit itself. Theoretically, in a "breeder economy," which visualizes a network of fast reactors using Pu as their principal fuel, the production of fuel by an FBR compensates for the unit's high cost. The attractiveness of the breeder economy is determined by the cost of uranium fuel for thermal reactors. If natural uranium is scarce and expensive, the FBR may be economically attractive. If, as is now the case, uranium is cheap and plentiful, the FBR holds no economic advantage over the LWR.

Thus, while Superphénix is an important technical achievement and a tribute to European cooperation in nuclear energy development, it is also a symbol of past expectations. Until the mid-1970s, when both NERSA and SBK were formed to pool the resources of countries in the European Community for the development of FBRs, the fast reactor offered a solution to the anticipated problem of uranium scarcity. Since that time the commercial lure of the FBR has disappeared. Declines in electricity demand growth and gluts in the uranium and oil markets have led utilities to restructure their economic priorities. The US government abandoned the Clinch River FBR project three years ago because the economics of the project no longer seemed favorable. Japan's Monju FBR, originally scheduled for operation this year, is still in the planning stage.

Table 7

COMMERCIAL FAST BREEDER REACTORS

Owner/Operator	Unit	Location	MWe	Commercial Operation Date
USSR	BN-350	USSR	350	1973
EDF[1]	Phénix	France	233	Dec 1973
UKAEA[2]	Dounreay	UK	250	Aug 1976
USSR	BN-600	USSR	600	Oct 1980
NERSA[3]	Superphénix	France	1200	Jan 1986
SBK[4]	Kalkar*	FRG	295	Jan 1987
PNC[5]	Monju**	Japan	280	indefinite

*Under construction
**Planned
[1]EDF = Electricité de France.
[2]UKAEA = United Kingdom Atomic Energy Authority.
[3]NERSA = Centrale Nucléaire Européene a Neutrons Rapides SA.
[4]SBK = Schnell-Breuter Kernkraftwerksgesellschaft mbH.
Rheinisches-Westfaelisches Elektrizitaetswerk AG (RWE) owns 68.75 percent, the Dutch utility group SEP and Belgium's Electronucleaire own 14.75 percent each, and Britain's CEGB owns 1.75 percent.
[5]PNC = Power Reactor and Nuclear Fuel Development Corporation (Japan).

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RECENT DEVELOPMENTS

FRANCE

Effective January 1, 1986, some of the uranium holdings of the large energy and mining group Total have been reorganized. Compagnie Minière Dong Trieu (CMDT) and Société Centrale de l'Uranium et des Minérais et Métaux Radioactifs (SCUMRA) have been merged into Total Compagnie Minière France (TCMF). TCMF is owned by Total Compagnie Minière (99 percent) and Total Compagnie Francaise des Pétroles (1 percent).

Figure 1 shows the revised ownership structure for uranium holdings of the Total group. Prior to the merger, CMDT owned and operated the Bernardan and Loges mines in Mailhac, and SCUMRA produced uranium at the open-pit mine at Saint-Pierre du Cantal, which was shut down in June 1985. Other wholly-owned subsidiaries of Total Compagnie Minière include Total Mining Australia Pty. Ltd., which owns the undeveloped Ben Lomond project in northern Queensland, and Minatome Corporation in the USA. In addition, Total owns ten percent of the Rossing project in Namibia, the world's largest open-pit uranium mine.

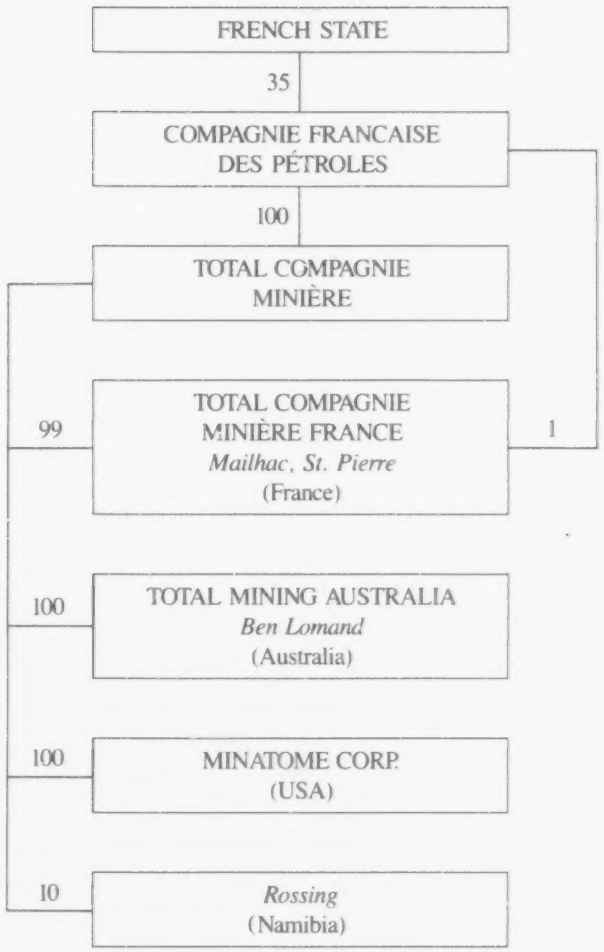

Figure 1. Ownership Structure of Uranium Holdings in the Total Group.

JAPAN

The Japanese utilities recently announced 1985 performance results for their 32 commercial nuclear units, which represent a total of 24,521 MWe net generating capacity. The 32 units accounted for approximately 24 percent of Japan's commercially produced electricity in 1985. Comprised of 16 BWRs, 15 PWRs, and one gas-cooled reactor, Japan's nuclear program achieved an average availability factor of 75.6 percent and an average capacity factor of 74.2 percent. The results established new records, and 1985 was the fourth year in a row that these factors have exceeded 70 percent. The results include five units which entered commercial operation last year and operated for only part of 1985. Table 8 lists these reactors.

For the last five years the Japanese utilities, in cooperation with various domestic reactor manufacturers, have performed conceptual studies for the design of a new generation of BWR and PWR facilities. Designated as *ABWR* and *APWR* (for *advanced* BWR and PWR), the new types of plants have capacities of approximately 1,300 MWe, a significant increase over the current maximum size of 1,100 to 1,200 MWe. Tokyo Electric Power Company (TEPCO) has indicated it will probably adopt the new ABWR design for Kashiwazaki Units 6 and 7, scheduled to be in operation after 1995. Concurrently, the Ministry of International Trade and Industry (MITI), in cooperation with the utilities and reactor manufacturers, has initiated a study to evaluate yet another generation of plant designs that will follow the ABWR and APWR. The study will review the feasibility of plant sizes approaching 1,500 MWe, and in 1987 will begin executing conceptual designs. The emphasis on larger-capacity plants stems not only from the economy of scale of larger plants, but also from the desire to maximize utilization of the limited number of plant sites available in Japan.

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Recently the US Department of Energy (DOE), the predominant supplier of enrichment services to Japanese utilities, approached its Japanese clients to solicit financial support for DOE's AVLIS laser enrichment program. In September 1985, DOE first solicited support from the Japanese government for the program (see Report 207, November 1985). In response to the request, the utilities in December 1985 formed a study group led by senior members of their respective nuclear departments to evaluate DOE's request. At the government-level meetings, DOE had suggested Japan contribute $2 billion to DOE's program, and subsequent credits would be granted to the utilities for future enrichment service charges based on interest on the contributed sum. In subsequent discussions with the utilities, DOE further proposed an increase in the total quantity of enrichment services it would supply to Japan under existing Utility Services enrichment contracts (USEC) held by the utilities, in particular those that had elected to take 70 percent of their requirements under the USEC.

Although the utilities appeared agreeable to contributing some degree of financial support to the AVLIS program, DOE's proposal to increase services delivered under the USEC has created considerable consternation among utilities. At present, the utilities are proceeding with plans to build and operate their own domestic enrichment facility, having an annual capacity of 1.5 million SWU by the mid-1990s (Report 206, July 1985). The DOE request to increase SWU quantities is viewed as unreasonable, and is a disturbing sign to the domestic enrichment program. Subsequently the government agency protested to DOE that the proposed additional SWUs contradicted the initial discussions which occurred at the government level. Discussions between the utilities and DOE are continuing. Assuming some modification to DOE's proposal, in particular that part related to supply of additional enrichment, it is expected that Japanese utilities will ultimately provide significant financial support for the DOE program, although perhaps less than the suggested sum.

* * *

The Uranium Resources Development Committee (URDC) of Japan indicated it will initiate a joint feasibility study with the People's Republic of China for the mining of uranium reserves at Chinglong in China. URDC is an organization sponsored by the Japanese government and staffed by personnel from nuclear utilities and related companies. Chinese agencies have supplied URDC with preliminary geological data for purposes of evaluation. If the study proceeds, a detailed site evaluation will be made over a two-year period to confirm reserves and to plan its development. No information regarding the size or nature of the deposit was released, although the possibility of starting to mine as soon as 1991 was mentioned.

If the project proves viable, Japanese participants would be allocated a portion of production beginning in 1995. It is estimated that current US dollar production cost would be less than $20 per pound U_3O_8. To minimize initial investment, manual production methods may be utilized instead of a highly mechanized operation.

Table 8

UNITS ENTERING COMMERICAL OPERATION IN 1985

Unit	Utility	MWe	Type	COD[1]
Takahama 3	Kansai EPC[2]	870	PWR	Jan 1985
Takahama 4	Kansai EPC	870	PWR	Jun 1985
Fukushima II-3	Tokyo EPC	1100	BWR	Jun 1985
Kashiwazaki 1	Tokyo EPC	1100	BWR	Sep 1985
Sendai 2	Kyushu FPC	890	PWR	Nov 1985

[1]COD = Commercial Operation Date.
[2]EPC = Electric Power Company.

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RECENT DEVELOPMENTS

SOUTH AFRICA

Fourth quarter uranium production from members of the Chamber of Mines totaled 3,102,000 pounds U_3O_8, almost equalling third-quarter production. Table 9 shows the quarterly production figures for 1985.

Total production of 12.2 million pounds U_3O_8 in 1985 represents a 15-percent decline from the 1984 level of 14.5 million pounds. The chief reason for this drop was the cessation of operations at Beisa and Blyvooruitzicht at the end of 1984. Beisa, which had been producing approximately one million pounds annually, was shut down because of sharply increasing losses. Being a primary uranium producer with gold as a by-product, the mine was unable to rely on gold operations to remain profitable. Blyvooruitzicht, a relatively high-cost producer, ceased uranium production in November 1984.

Other factors contributing to the decline in 1985 production include the following:

1. Western Deep Levels ceased production during the second quarter of 1985, so there was no output in the third or fourth quarters. However, sales from its stockpile continued during that period.

2. Production at Driefontein Consolidated fell 45.7 percent, mostly due to decreased throughput and yield.

3. Production fell 48.5 percent at Chemwes (Stilfontein), whose officials announced in March 1985 a provisional reduction of 60 percent of capacity due to reduced current demand.

4. Harmony and Vaal Reefs each recorded small declines in 1985.

The South African uranium industry has now shut down its unprofitable plants and has curtailed production so that it matches current contract commitments. The gold and uranium operations remain highly viable due to record rand gold prices. Domestic political unrest and international concern caused a dramatic decline in the value of the rand relative to other currencies throughout 1985, but because most South African uranium contracts are priced in US dollars, the weaker rand helped to alleviate the downward pressure on US dollar-denominated uranium prices.

Table 9

REPUBLIC OF SOUTH AFRICA:
1985 URANIUM PRODUCTION[1]
(Thousands of Pounds U_3O_8)

Operation	First Quarter 1985	Second Quarter 1985	Third Quarter 1985	Fourth Quarter 1985	Total 1985
Beisa (St. Helena)	0	0	0	0	0
Blyvooruitzicht	0	0	0	0	0
Buffelsfontein	401	378	366	428	1,573
Chemwes (Stilfontein)	148	148	160	139	595
Driefontein Consolidated	45	47	51	48	191
ERGO[2]	83	76	92	95	157
Harmony	256	225	225	234	940
Hartebeestfontein	239	222	243	240	944
JMS[3]	314	356	348	310	1,328
Randfontein	291	319	363	371	1,343
Vaal Reefs	1,156	799	1,137	1,059	4,151
Western Areas	150	189	171	178	687
Western Deep Levels	62	57	0	0	119
TOTAL[4]	3,145	2,816	3,154	3,102	12,218

[1]Excludes Palabora Mining Company, which is not a member of the Chamber of Mines.
[2]ERGO = East Rand Gold and Uranium Co. Ltd.
[3]JMS = Free State Joint Metallurgical Scheme.
[4]Columns may not add due to rounding.

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1985 US URANIUM ACTIVITIES

Introduction

The decline of activity in all phases of the uranium industry continued through its fifth consecutive year. The price of uranium, as measured by the Nuexco Exchange Value, rose to $17.00 by the end of 1985, the first steadily upward movement in 15 months. Active and potential producers are still waiting for higher market prices and industry stability. Nevertheless, only a rapid and sizeable market recovery will end the debate over the industry's viability.

The year began with the Exchange Value at $15.25 per pound U_3O_8. Because of several inventory liquidations in an already weak market, it fell to $14.25 in April, the lowest figure ever recorded in Exchange Value history. That decline acted as a trigger for further producer recession; several companies responded almost immediately by relegating their projects to standby or shut-down status. By the end of the year, exploration and mining levels had fallen below those in 1950.

Nuexco estimates production from all sources in 1985 to be approximately 11.1 million pounds U_3O_8, down from 15.6 million pounds in 1984. Nine conventional mills were in production during January, but only three operated throughout the year; the other six mills were taken out of service before mid-year. Two mills were started-up in the fourth quarter, one of which was again placed on stand-by at the end of the year. Approximately six million pounds U_3O_8 were produced at conventional mills, about 3.3 million pounds were produced from phosphate production, and the remaining concentrates came from solution and heap-leach mining. Table 10 gives the operating status of conventional mills throughout 1985.

Project Activity

Nuexco estimates 1985 exploration and development drilling to be 1.8 to 2.0 million feet, the lowest level since 1950. The surface drilling rate has now declined for the seventh consecutive year (the all-time high was 47 million feet drilled in 1978). Exploration geologists were active primarily in northern Arizona, but also carried out some limited work in the following areas:

— Live Oak, Duval and Kleberg counties of the South Texas district;
— northwestern Nebraska;
— three Tertiary basins in Wyoming, and
— southeastern Utah.

Success was primarily limited to significant high-grade mineralization discovered in breccia pipes located in northern Arizona. Discoveries in other areas were mostly confined to extensions of known deposits and projections along mineral and structural trends. These discoveries generally have a lower uranium content, but are important in sustaining industry activity in the particular area.

Arizona — The past exploration successes in northern Arizona resulted from extraordinary effort on the part of active companies. At present there are at least four major mining companies, plus approximately 16 small companies and independent operators, exploring in the district. Each employs its own techniques to discover uranium associated with solution-collapse structures in Permian and Mississippian sediments.

Table 10

1985 OPERATING STATUS OF CONVENTIONAL URANIUM MILLS IN THE USA
(O = Operating, S = Stand-by)

Company	Jan.	Jul.	Dec.	Location
Bear Creek Project	O	O	O	Powder River Basin, WY
Chevron Resources Co.	O	S	S	Hobson, TX
Cotter Corp.	O	S	O	Canon City, CO
Homestake Mining Co.	O	S	S	Grants, NM
Pathfinder Mines*	O	S	S	Gas Hills, WY
Pathfinder Mines	O	O	O	Shirley Basin, WY
Petrotomics Corp.**	O	S	S	Shirley Basin, WY
Quivira Mining Co.	O	S	S	Grants, NM
Rio Algom Corp.	O	O	O	La Sal, UT
Union Carbide & Energy Fuels	S	S	O	Blanding, UT

*Closed for renovation.
**Decommissioned in 1985.

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Not all of the companies have enjoyed exploration success; in fact, only Energy Fuels Nuclear, Inc. has announced recent discoveries. Pathfinder Mines Corporation and Rocky Mountain Energy Company have aggressive exploration programs which may have resulted in limited success, although neither company has made an announcement to that effect. Usually a new discovery remains unannounced to allow time for the company to solidify its land position within the area of interest.

The geologic development of a breccia pipe in the Grand Canyon district is believed to be related to the simultaneous occurrence of regional structural events in addition to erosional patterns established by the Colorado River drainage system. Indeed, there is surface evidence that thousands of beccia pipes may exist within the large area of interest. The area covers approximately 8.25 million acres (about 12,800 square miles) — from the Utah/Arizona state line to the north, Marble Canyon to the east, Grand Wash Cliffs to the west, and the approximate mid-point between Flagstaff and Grand Canyon to the south. However, about five million acres are withdrawn from mineral entry because of national and recreational parks and portions of three Indian reservations. Of the remaining 3.25 million acres, about 300,000 acres are covered by a thick basalt flow and is not feasible for prospecting by present means. The remaining 1.7 to 1.8 million acres are available for prospecting; four major companies control approximately 1.2 million acres, and the independents control about 30,000 acres. Roughly 500,000 acres of land remains available for prospecting. Figure 2 shows the geographic location of the general area of interest and the location of known mineralized breccia pipes.

Energy Fuels, with about 900,000 acres, controls the largest land position in the district; Rocky Mountain Energy controls about 180,000 acres, Pathfinder Mines controls approximately 90,000 acres, and Uranerz Exploration and Mining Ltd. controls about 15,000 acres. Land status within the area of interest is mostly Public Domain, with scattered State leases in the north portion. Ownership is divided roughly between private, State, Indian and Public Domain in the south portion. Prospecting rights are secured on Public Domain by staking a lode mining claim which can legally include up to 20 acres per claim, and by securing a lease or permit for prospecting and mining the remaining land from the land owner.

Interest in the district was renewed in 1974 when Western Nuclear Inc. made two high-grade discoveries in the vicinity of Hack Canyon, site of a copper/uranium discovery in the early 1950s. Western Nuclear discovered the Hack 1 deposit in 1974 and the Hack 2 deposit in 1975. Energy Fuels began staking claims in the district and initiated drilling in 1980. Soon thereafter, Energy Fuels purchased the Hack 1 and 2 mines and surrounding claims from Western Nuclear.

Energy Fuels proceeded to develop the Hack 1, 2, and 3 mines, the Pigeon mine, and is presently developing a fifth mine on the Kanab North deposit. The Hack 1 mine has been on standby status since 1984. The permitting process for the Pinenut ore body, discovered in June 1985, is scheduled to be completed by mid-1986; shaft development may begin by the end of the year. All of these deposits are located to the north of the Colorado River. An Environmental Impact Study for the Canyon deposit, located south of the river, is presently in final review. Mine permit applications are awaiting final approval by various state and federal agencies. Initial shaft construction could begin in the second half of 1986.

The discoveries made by Energy Fuels can be credited to sophisticated exploration techniques developed since 1980. The exploration department conducts detailed studies of aerial photographs to select potential areas of interest showing one or more circular structures. The structures are then examined on the ground to determine the mineralization. Evaluation studies include geologic mapping, sampling of surface rocks, and detailed on-site geochemical and geophysical studies.

In cases where results may indicate the presence of a mineralized structure, reconnaissance drilling is initiated, both inside and outside the limits of the structure. Each hole is usually core-drilled from top to bottom of the potential mineralized zone in each structure. Usually, only two to four drill holes are required to determine whether the structure is mineralized. When mineralization is encountered, 15 to 25 drill holes may be required to establish the nature of mineralization and determine the potential size of the deposit. However, due to the structural and stratigraphic nature of a breccia pipe, it is extremely difficult and geologically risky to attempt a complete evaluation of a deposit by surface drilling alone. It is necessary to sink a shaft outside the influence of the structure and drift laterally into strategic sections of the mineralized zone. Follow-up long-hole drilling, usually in a radial pattern above and below the drift level, is required at measured intervals along the length of each drift. A final estimate of ore body size and grade can be tabulated from combined results of surface drilling and underground drifting and drilling. For example, the results of surface drilling of the Pigeon deposit indicated the presence of 2.5 million pounds U_3O_8. Underground exploration drifting and long-hole drilling increased total reserves to almost six million pounds. Each mineralized pipe discovered to date has a similar history in determining the size and grade of the deposit.

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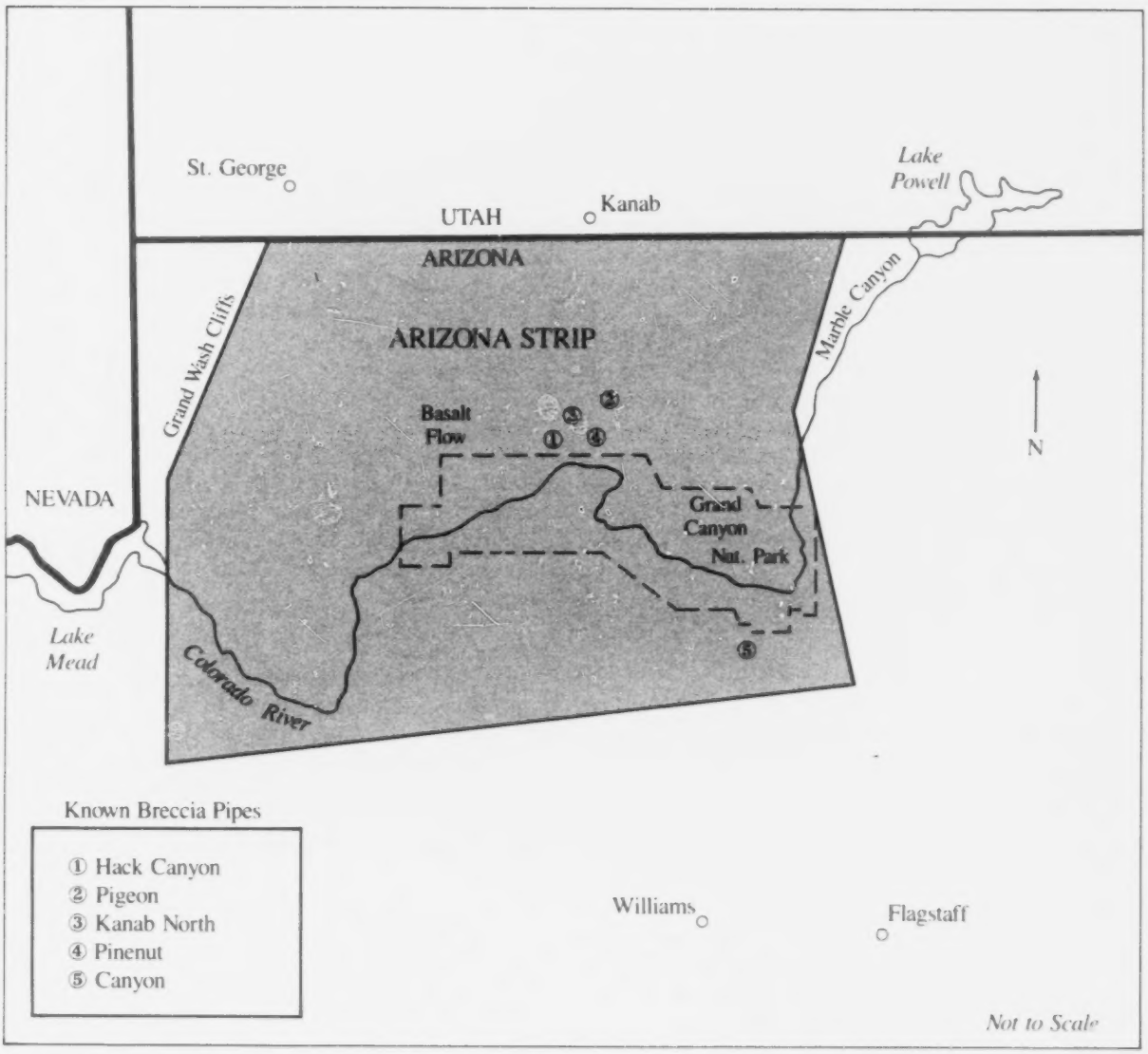

Figure 2. Shaded area indicates general area of interest for exploration and mining of breccia pipe structures in the Grand Canyon region of northwestern Arizona.

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RAW MATERIALS

Energy Fuels has identified over 3,000 circular structures through its preliminary evaluation process since 1980. About 1,000 structures have been studied in limited detail, but only 280 have received complete geologic evaluation, including reconnaissance drilling. A total of 490 deep holes have been drilled to date; mineralization was encountered in one out of every three holes drilled. The exploration department is scheduled to transfer at least one ore deposit each year to the mining department.

Texas — Approximately five companies conducted new exploration projects in the South Texas district in 1985. Drilling was concentrated on targets in the Goliad Formation, where past experience indicates the greatest potential for large, high-grade deposits. In addition, Goliad ores have proven conducive to solution mining techniques. Favorable Goliad mineral trends are being explored in Duval, Brooks and Kleberg counties. Activity continues along the known trends in the Oakville Sandstone, primarily in Live Oak and Bee counties, but to a lesser degree. No announcements of important new discoveries have been made.

Mining activity throughout the district is at its lowest level in about seven years. Chevron Minerals Corporation stopped mining the district's only conventional open pit mines and acid mill and began pit reclamation in April. Milling operations ended in June. Chevron controls additional reserves in the general vicinity of the mill site. It is probable that the future status of the mill is dependent upon a tentative development schedule of those reserves.

There are five operating solution mines in the district, down from ten in 1982:

1. Mobil Corp., mining the Holiday-O'Hearn deposit near Bruni;

2. Intercontinental Energy Corp. (IEC), mining the Zamzow deposit at Three Rivers;

3. US Steel Corp., mining both the Clay West and Burns Ranch deposits near George West;

4. Everest Minerals Corp., mining the Mt. Lucas deposit, in southern Live Oak County;

5. Chevron Resources Corp., mining the Palangana Dome in Duval County. Production potential from the five properties is about 3.8 million pounds annually, but 1985 production totaled an estimated 1.8 million pounds. US Steel remains the largest single producer in the district.

Nebraska — Exploration activity was limited to three or four companies, all active in Dawes and Box Butte counties in the northwest corner of the state. No new discoveries were announced. Therefore, the Crow Butte project, controlled by the Wyoming Fuels Co./Ferret Exploration Co. joint venture, remains the only uranium deposit under consideration for development within the state.

A pilot plant for testing the feasibility of solution mining is under construction at Crow Butte. The 100 gallon-per-minute plant is scheduled to be operating by mid-1986. Two 5-spot well patterns are in place and ready for operation to determine favorable well pattern design and complete leach technology. The leach test program will continue for approximately 12 months, followed by an additional four to six months testing to demonstrate formation restoration procedures. Upon completion of a successful pilot test, the joint venture will be capable of commercial production.

Wyoming — Exploration and development activities were limited to the Powder River Basin, Gas Hills and Shirley Basin. In the Powder River Basin, Everest Minerals Corp. continues to test portions of the Highland ore deposit for solution mining in anticipation of moving up in the near future to commercial production. The Central Electricity Generating Board (CEGB) of Great Britain purchased the Leuenberger property, located in the southern part of the basin, in August. The property is a potential in-situ leach (ISL) project, and required mining permits are already in place as a result of a successful pilot test program conducted in 1983.

Malapai Resources acquired the remaining 50 percent interest in the Christensen Ranch property from Western Nuclear, Inc., and secured a two-year option to purchase the Irigaray property and ISL plant from Westinghouse. Preparations are in progress to initiate solution mining studies on both properties, possibly beginning in mid-1986. Furthermore, Malapai has tentatively scheduled commercial production from at least one of several potential ore deposits on the properties in late 1987 or early 1988. At present the only sustained production in the Powder River Basin is from two small solution mining operations by Sequoyah Fuels Corp. The recovery centers are part of the Bill Smith property, which was originally developed as an underground mine in the late 1970s.

Pathfinder Mines is the only operator in the Gas Hills and Shirley Basin regions. In March, the Gas Hills mill was closed for renovation prior to the continuation of mining at the Lucky Mc mine and any new projects that may be scheduled for future development. In December, Pathfinder also acquired a property controlled by Petrotomics, suggesting that an additional ore source will be available to sustain operations at the Shirley Basin mill.

Utah — The October 1 reopening of the Union Carbide/Energy Fuels White Mesa mill located near Blanding was the

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high point of activity in southeastern Utah. The mill is processing stockpiled ore from Energy Fuels' three Hack Canyon mines and the Pigeon mine. Additional ore is trucked from the mines in northern Arizona to the mill, a distance of over 300 miles. The mill is scheduled to continue operation through 1986.

The Rio Algom mill in La Sal, Utah continued operation throughout the year. In order to increase the ore supply, Rio Algom purchased custom ore from independent miners. The opportunity to sell ore slightly rejuvenated the local industry; seven mines were reopened and new project evaluation was undertaken in some cases. Rio Algom is now scheduling operations throughout 1986.

In the same district, Minatome Corp. satisfied annual assessment requirements by driving exploration adits into several ore deposits to establish ore body characteristics and obtain bulk samples for metallurgical testing. The ore deposits are now ready for mining should Minatome decide to move ahead with its uranium program. The several hundred tons of ore mined were processed at the nearby Rio Algom mill.

Events that further affected the US uranium industry in 1985 are listed chronologically in Table 11.

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Table 11
1985 URANIUM-RELATED ACTIVITIES IN THE USA

Month	Organization	Event or Announcement
Jan	Quivira Mining Co.	Announced full stand-by status for all mines and mill within next few months, Grants, New Mexico.
Jan	Western Nuclear, Inc.	Shutdown Ruby Lake Mine, Grants, New Mexico.
Jan	Homestake Mining Co.	Mill restart after 3-month down period, Grants, New Mexico.
Jan	Rio Algom Corp.	Shutdown Mi Vida mine, La Sal, Utah.
Feb	Chevron Resources Co.	Announced plan to re-open Mt. Taylor mine for 12-month period of engineering and economic evaluation, Grants, New Mexico.
Feb	Cotter Corp.	Mill placed on stand-by, Cañon City, Colorado.
Feb	Western Nuclear, Inc.	Announced intent to sell all uranium properties.
Mar	UNC Resources Corp.	Announced intent to dispose of all uranium properties.
April	Homestake Mining Co.	Announced suspension of milling and cutback on all mine activity, Grants, New Mexico.
April	Anaconda Mining Co.	Announced plan to sell all uranium properties.
May	US Government	Legislation for a $1 billion fund to clean up active uranium tailings piles in US sent to Congress.
June	Texaco Minerals Co.	Decommissioning of Petrotomics mill underway, Shirley Basin, Wyoming.
June	Rocky Mt. Energy/ Mono Power, Inc.	Announced termination of joint venture agreement for all uranium projects, including the Bear Creek project, Powder River Basin, Wyoming, effective 7-1-85.
June	Amoco Minerals Co.	To transfer all mineral projects to Cyprus Minerals Corp., 7-1-85
June	Uranium Producers of America	Filed suit against DOE regarding uranium enrichment policies.
July	Anaconda Mining Co.	Announced intent to sell entire mining company.
Aug	State of Wyoming	Filed "friend of the court" brief before US District Court in support of UPA lawsuit regarding DOE's uranium enrichment policies.
Sep	Homestake Mining Co.	Closed mill and reduced mining to two crews and recovery from mine waters, Grants, New Mexico.
Sep	Energy Fuels Nuclear	Entered exploration joint venture with CEGB, Arizona Strip district.
Sep	State of New Mexico	State and DOE agreed on procedure for stabilizing the Phillips/UNC tailings; first such agreement ever for the industry.
Sep	US DOE	Declared US uranium industry to be nonviable.
Oct	Conoco, Inc.	Concluded ISL production and began full restoration, Trevino project, Hebbronville, Texas.
Oct	Cotter Corp.	Start-up of mill at Cañon City, Colorado.
Nov	Uranium Resources, Inc.	Resubmitted mining application to the Texas Water Commission for the Kingsville Dome project, near Kingsville, Texas.
Dec	Minatome Corp.	Entered exploration joint venture with Concord Oil Corp. on property in vicinity of Palangana Dome, Duval County, Texas.
Dec	Cotter Corp.	Closed mill after 3-month run, Cañon City, Colorado.
Dec	Quivira Mining Co.	Request made to Bureau of Land Management for stand-by status of Church Rock mines in final review. If granted, mines will be sealed and allowed to flood.

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EXCHANGE AND TRANSACTION VALUES
SINCE JANUARY 1980

Determined as of the last day of the month indicated

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HISTORICAL MARKET DATA

HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	32.50	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	16.00	16.00	16.50	16.75	17.00
1986	**17.00**											

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	15.10	15.10	15.75	15.80	16.55
1986	**16.55**											

HISTORICAL CONVERSION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U in UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.00	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1986	**1.60**											

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AUSTRALIA

	Price Index of Materials Used in Manufacturing Industry—All Groups[1] (1969=100) (1976=100)	Award Rates of Pay Indexes Australia—Adult Males In Mining Wage and Salary Earners, Weekly Rates[2]
1975 Avg.	150.4	132.6
1976 Avg.	168.4	160.9
1977 Avg.	192.0	179.0
1978 Avg.[3] [4]	198.5	190.0
1979 Avg.	248.8	127.9
1980 Avg.	321.8	140.8
1981 Avg.	355.3	154.1
1982 Avg.[5]	368.6	174.9
1983 Avg.	401.2	181.8
Jan 1984	399.2	188.7
Feb 1984	402.5	188.6
Mar 1984	403.9	188.4
Apr 1984	404.2	196.2
May 1984	403.8	197.0
Jun 1984	404.9	197.4
Jul 1984	408.3	197.4
Aug 1984	413.2	197.4
Sep 1984	411.9	197.4
Oct 1984	408.5	197.4
Nov 1984	407.1	197.4
Dec 1984	406.0	197.4
FY84 Avg.[6]	402.1	—
FY85 Avg.[6]	422.2	—
Jan 1985	409.3	197.4
Feb 1985	416.1	197.4
Mar 1985	430.9	197.4
Apr 1985	440.8	202.3
May 1985	454.4	202.3
Jun 1985	458.9	202.4
Jul 1985	459.0	202.3
Aug 1985	454.9	202.4
Sep 1985	447.7	202.4
Oct 1985	—	202.4

P = Preliminary R = Revised since last month

[1] Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0).
[2] Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (Catalogue No. 6312.0). Figures for the latest fourteen months shown are subject to revision.
[3] Monthly data for 1970-78 appear on pages 4.7 and 4.8 of Report 138.
[4] Annual averages prior to 1979 reflect index base no longer in use.
[5] Monthly data for 1979-82 appear on page 35 of Report 184.
[6] Annual averages are for financial year ending June 30.

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GOVERNMENT STATISTICS

CANADA

	Industry Selling Price Index: Manufacturing[1] (1971 = 100)	Wage-earner Data: Average Hourly Earnings (C$)[2]					
		Uranium Mines (SIC 057)	Metal Mines (SIC 051-059)	Mines, Quarries and Oil Wells[3] (SIC 051-099)	Primary Metal Industries Non-ferrous[4] (SIC 296)	(SIC 298)	Chemicals and Chemical Products[5] (SIC 372-379)
1979 Avg.[6]	217.9	—	9.60	9.66	—	—	7.67
1980 Avg.	247.2	—	10.58	10.80	—	—	8.50
1981 Avg.	288.7	—	12.02	12.23	—	—	9.53
1982 Avg.[7]	288.8	—	13.74	13.92	—	—	10.63
1983 Avg.	298.8	—	—	14.30	—	—	11.17
Jan 1984	305.4	17.74	15.27	14.74	11.91	10.84	11.69
Feb 1984	306.6	17.90	15.59	14.90	12.04	10.82	11.51
Mar 1984	308.7	18.05	15.52	14.82	12.14	10.84	11.58
Apr 1984	310.5	18.06	15.83	15.10	11.96	10.34	11.63
May 1984	310.6	18.48	15.64	15.06	12.11	10.16	11.65
Jun 1984	311.0	18.08	15.48	14.80	12.38	10.40	11.66
Jul 1984	312.9	17.81	15.72	14.92	12.53	10.18	11.82
Aug 1984	312.7	17.24	15.36	14.92	12.44	10.34	11.78
Sep 1984	312.3	17.68	15.96	15.34	12.51	10.52	11.90
Oct 1984	312.3	17.64	16.15	15.26	12.69	10.56	11.96
Nov 1984	313.6	18.04	16.13	15.43	12.47	10.51	11.96
Dec 1984	314.2	17.95	16.39	15.60	12.16	10.40	11.99
1984 Avg.	310.9	17.88	—	15.07	12.28	10.49	11.76
Jan 1985	315.9	18.05	16.13	15.60	12.32	10.80	12.04
Feb 1985	316.5	18.78	16.41	15.68	12.52	11.05	12.06
Mar 1985	318.0	18.24	16.21	15.57	12.44	10.97	12.02
Apr 1985	318.3	18.63	16.44	15.80	12.81	11.23	12.04
May 1985	318.8	19.41	16.51	15.63	12.76	11.25	12.15
Jun 1985	319.1	18.49	16.20	15.49	12.89	11.14	12.14
Jul 1985	319.4	18.14	16.19	15.41	12.96	11.17	12.13
Aug 1985	319.2	17.07	15.76	15.30	12.97	11.31	12.19
Sep 1985	319.4	18.53R	16.55R	15.72R	12.95R	11.39R	12.26R
Oct 1985	320.2	18.74	16.51	15.70	13.14	11.53	12.33
Nov 1985	—	19.09P	16.73P	15.89P	13.00P	11.30P	12.66P

P = Preliminary R = Revised since last month

[1]Statistics Canada, Prices Division, Ottawa: "Industry Price Indexes" (Catalogue 62-011). Indexes for the most recent six months shown are subject to revision.
[2]Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa: "Employment, Earnings and Hours" (Catalogue 72-002).
[3]Reports 175 through 185 list this series title incorrectly as "Metal Mining, Including Milling (SIC 050-099)."
[4]Beginning with the April 1983 figure, Primary Metal Industries, non-ferrous is split into SIC 296 and SIC 298.
[5]Chemical and Chemical Products prior to April 1983 was SIC 370-379. The new series is from a new survey which includes all companies and is based on a 1970 classification. The old survey only included companies of 20 employees or more.
[6]Monthly ISPI for 1977 and 1978 appear on page 4.10 of Report 138, and monthly wage-earner data for 1973-78 appear on page 4.11 of Report 138.
[7]Monthly data for 1979-1982 appear on page 37 of Report 184. On that page, the wage earner index entitled "Metal Mining, Including Milling (SIC 050-099)" should read "Total Mining (SIC 051-099)."
[8]Beginning with the April 1983 figure, Wage Earner Data are based on a census of all companies employing 200 or more wage earners, *plus* a random survey of companies employing fewer than 200 wage earners. Prior to April 1983 only companies employing 200 or more wage earners are included in the Wage Earner Data.

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REPUBLIC OF SOUTH AFRICA

		Average Declared Working Costs per per Metric Ton of Gold Ore Milled (Rand)[1]	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled (March 1982 = 100)[2]	Consumer Price Index[3] (1980 = 100)[4]	Producer Price Index All Groups[5] (1980 = 100)	Total Employment in Mining and Quarrying (Code 35)[6]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[6]
1975	Avg.	16.71	—	157.2	100.0	639,473	1,003,617
1976	Avg.	19.30	—	174.7	115.1	671,240	1,212,983
1977	Avg.	23.87	—	194.4	130.0	712,006	1,420,670
1978	Avg.	27.14	—	137.2	142.7	664,571	1,537,169
1979	Avg.[7]	30.18	—	155.3	164.5	692,209	1,830,632
1980	Avg.[8]	35.53	—	176.7	192.1	714,379	2,279,615
1981	Avg.	41.89	—	206.5	218.3	728,506	2,820,505
1982	Avg.[9]	47.25	104.2	233.5	248.7	707,552	3,246,071
1983	Avg.	51.87	115.0	262.2	274.8	696,579	3,644,772
Jan	1984	—	—	274.7	283.3	689,807	326,619
Feb	1984	—	—	278.4	286.5	702,553	335,906
Mar	1984	55.30	123.1	281.9	288.0	715,628	342,332
Apr	1984	—	—	286.1	290.2	712,963	327,550
May	1984	—	—	288.3	292.6	710,040	327,937
Jun	1984	56.95	126.2	291.2	295.3	717,009	347,121
Jul	1984	—	—	295.1	296.0	717,121	369,964
Aug	1984	—	—	297.0	300.8	721,905	361,357
Sep	1984	60.64	133.2	299.9	304.1	721,470	359,218
Oct	1984	—	—	303.7	308.7	717,865	363,755
Nov	1984	—	—	307.4	312.8	717,396	369,771
Dec	1984	62.92	138.6	309.4	315.9	701,198	365,234
Jan	1985	—	—	177.1	166.6	711,366	376,777
Feb	1985	—	—	182.8	171.3	727,932	361,823
Mar	1985	64.48	142.4	183.6	173.0	708,809	371,380
Apr	1985	—	—	187.4	174.0	724,187	369,005
May	1985	—	—	189.5	177.7	708,085	373,478
Jun	1985	67.42	148.9	191.9	179.2	724,587	395,543
Jul	1985	—	—	193.6	180.7	738,228	419,106
Aug	1985	—	—	195.6	183.2	734,121	416,777
Sep	1985	70.47	155.3	197.8	184.8	732,836	419,883
Oct	1985	—	—	200.8	188.1	—	—
Nov	1985	—	—	203.4	196.0	—	—
Dec	1985	—	—	207.4	—	—	—

[1]Chamber of Mines of South Africa, Johannesburg; "Analysis of Working Results," published quarterly.

[2]Page 16 of Report 178 contains description and calculation of index, and page 24 of Report 178 lists figures for 1982.

[3]Republic of South Africa Department of Statistics, Pretoria; "Government Gazette: Consumer Price Index for Urban Areas."

[4]The basis for calculation prior to January 1985, 1975 = 100. For annual averages prior to 1978, April 1970 = 100.

[5]Previously known as the Wholesale Price Index, now the Producer Price Index. The computation remains the same. The basis for calculation prior to January 1985, 1975 = 100.

[6]Bulletin of Statistics, Department of Statistics, Pretoria.

[7]Historical data for the Average Declared Working Costs and Consumer Price Index 1970-1979 appear on page 4.9 of Report 140.

[8]Monthly data for Codes 35 and 40, 1977-1980, appear on page 28 of Report 157.

[9]Monthly data for 1979-82 appear on page 39 of Report 184.

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GOVERNMENT STATISTICS

UNITED STATES

	Producer Price Index[1]		Consumer Price Index[2]	GNP Implicit Price Deflator[3,4]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[5]			
	Industrial Commodities (1967 = 100)	All Commodities (1967 = 100)	(1967 = 100)	(1982 = 100)	Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
1980 Avg.[6]	274.8	268.8	246.8	178.64	10.26	10.63	8.30	6.94
1981 Avg.	304.1	293.4	272.4	195.51	11.55	11.98	9.12	7.62
1982 Avg.[7]	312.3	299.3	289.1	207.15	12.33	12.94	9.96	8.21
1983 Avg.	315.8	303.1	298.4	215.63	12.57	13.43	10.59	8.65
Jan 1984	319.1	308.0	305.2	—	12.68	13.37	10.88	8.91
Feb 1984	320.6	308.9	306.6	—	12.83	13.33	10.87	8.91
Mar 1984	321.9	311.0	307.3	106.6R	12.89	13.32	10.96	8.94
Apr 1984	322.5	311.4	308.8	—	12.94	13.29	10.94	8.94
May 1984	323.3	311.7	309.7	—	13.02	13.36	11.99	8.94
Jun 1984	323.9	311.4	310.7	107.6R	12.99	13.39	11.00	8.97
Jul 1984	324.0	312.0	311.7	—	13.06	13.34	11.09	9.00
Aug 1984	323.5	310.9	313.0	—	13.15	13.50	11.09	9.05
Sep 1984	322.3	309.5	314.5	108.6R	13.23	13.38	11.20	9.13
Oct 1984	323.2	309.4	315.3	—	13.26	13.53	11.29	9.15
Nov 1984	323.8	310.4	315.3	—	13.27	13.74	11.31	9.20
Dec 1984	323.0	309.9	315.5	109.6R	13.32	13.64	11.34	9.32
1984 Avg.	322.6	310.3	311.1	108.1R	13.05	13.43	11.08	9.04
Jan 1985	322.9	309.5	316.1	—	13.29	13.70	11.39	9.33
Feb 1985	322.5	309.2	317.4	—	13.30	13.73	11.39	9.33
Mar 1985	322.6	308.7	318.8	110.4R	13.29	13.95	11.37	9.39
Apr 1985	323.8	309.3	320.1	—	13.43	13.62	11.48	9.40
May 1985	325.3	309.8	321.3	—	13.24	13.59	11.46	9.39
Jun 1985	324.8	309.2	322.3	111.3R	13.23	13.66	11.52	9.46
Jul 1985	324.4	309.0	322.8	—	13.45	13.82	11.60	9.47
Aug 1985	323.7R	307.3R	323.5	—	13.55	13.69	11.62	9.50
Sep 1985	322.5	305.8	324.5	112.1R	13.44	13.66	11.67	9.55
Oct 1985	324.4	308.0	325.5	—	13.49R	13.64R	11.72R	9.56
Nov 1985	325.0	309.7	326.6	—	13.49P	13.95P	11.82R	9.61R
Dec 1985	325.2	310.2	327.4	113.0	—	—	11.94P	9.67P

P = Preliminary R = Revised since last month

[1]US Bureau of Labor Statistics, Washington, D.C.: "Producer Prices and Price Indexes," (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents.

[2]US Bureau of Labor Statistics, Washington, D.C.: Consumer Price Index for All Urban Consumers, US City Average, All Items.

[3]US Department of Commerce, Washington, D.C.: Bureau of Economic Analysis, National Income and Wealth Division: "Survey of Current Business." The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted.

[4]The basis for calculation of this index was revised to 1982 = 100. 1984 and 1985 figures have been adjusted to that basis. The basis for calculation prior to 1984, 1972 = 100.

[5]US Bureau of Labor Statistics, Washington, D.C.: "Employment and Earnings." All data based on 1972 revision of SIC Manual. Data for 1970-1976 are adjusted to the March 1977 benchmark. Data for 1977-1978 are adjusted to the March 1979 benchmark. Data for January 1979 and beyond are adjusted to the March 1980 benchmark.

[6]Monthly data 1970-1978 for Producer Price Index-Industrial Commodities, Consumer Price Index, and Employment and Earnings SIC codes 10, 333, and 28, and quarterly data for GNP Implicit Price Deflator appear on pages 4.6-4.8 of Report 139.
Monthly data 1977-1978 for Employment and Earnings SIC Codes 10, 333, and 28 appear on page 33 of Report 147.
Monthly data 1970-1978 for Employment and Earnings SIC Code 36 appear on page 23 of Report 154.
Monthly data 1977-1980 for Producer Price Index-All Commodities, appear on page 21 of Nuexco Report 158.

[7]Monthly data 1979-1982 for all listed indices appear on page 41 of Report 184.

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